

# PREVELANCE OF FECAL PARASITES IN FIELD STUDIES OF COCKATIELS AND BUDGERIGARS IN LAYYAH AND JHANG- PAKISTAN

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**ABSTRACT:** Parrots are from the order (Psittaciformes) that are found all over the world globally. Parrots are of different types and different subtypes; are reared at home, fanciers and at the farm level for business point of view. It is the loveliest bird due to its beautiful colors and voice to attract the people. The objective of this study was to find out the presence of parasitic oocysts in the parrots cockatiels (*Nymphicus hollandicus*) and budgerigars (*Melopsittacus undulatus*) through different laboratory procedures. The incidence of the cockatiels birds positive for the coccidiosis in Layyah found was (120/170) 70.5% and for *Capillaria* was (30/120) 17.6% while, mixed infection (*Eimeria* spp. + *Capillaria* spp.) prevalence was (20/120) 11.7%. The incidence of budgerigars Layyah parrots observed was (80/90) 89% for coccidiosis and for *Capillaria* was (10/90) 11% and no mixed infection (*Eimeria* spp. + *Capillaria* spp.) was reported in the present study. Prevalence of the cockatiel and budgerigar identified for the parasite diagnosis in Jhang; both showed positive for the coccidian only and the prevalence of coccidiosis in cockatiels was (210/210) 100% and in the budgerigars was (120/120) 100%. EPG counted through McMaster slide for the *Coccidia* was 750, while the EPG for *Capillaria* was 700 in both cases of cockatiels and budgerigars of Layyah and EPG counted through McMaster slide for the *Coccidia* was 750 in both cases of cockatiels and budgerigars of Jhang. EPG count for the coccidian in both species of parrots was same in the both districts that showed very weak burden of the parasites.

This study identified the parasitic loads in two cities of both parrot species. This study recommends for the proper management and deworming strategies against these parasites of both parrot species in these two cities to get rid of the parasitic burden to prevent other bird species in the region. The incidence of this study would be further identified by molecular characterization.

**Key words:** Parrot, Cockatiel, *Eimeria* spp., *Capillaria* spp., fecal examination, Molecular characterization

## INTRODUCTION:

The zoos are the places where a lot of the bird species are kept in the captivity that are threatened or near to extinct. Birds are protected under this environment and can breed easily. So, these birds are not only saved from visitor induced stress but also spreading of pathogens from local and non-migratory bird species [1]. But, Parasites are also the main disturbing factor of ecological balance [2, 3] in the predatory birds that have great role in the food web [4]. Parrots are the common fancy game birds that are found in the ecosystem all over the world [5]. Parrots are not only affected by the parasites but also are the main cause of economic losses. These parasites consume nutrients and vitamins resulting the decreased feed utilization, intestinal obstruction and toxins production in the host [6]. Parasites are considered to cause little or no distress to healthy wild birds. But, parasitic infections are the significant cleanliness problems for the captive birds in highly dense areas. So, parasites are the main cause of serious health issues or even deaths that are newly kept in the captivity or adopted into new environment [7]. Birds could be parasitized by a wide variety of endoparasites i.e. nematodes, trematodes, cestodes, acanthocephalans, and protozoa and it is important to identify and control parasite species capable of producing diseases in captive birds. Severe infections of endoparasites in birds significantly cause droopiness, loss of weight and diarrhea [8]. Dorrestein [9] reported that parasitic infestations i.e. protozoans, blood parasites and helminthes are the common issues of aviary populations. Sakas [10] reported the tapeworms were common in finches, cockatoo and eclectus parrots and also identified that coccidiosis was a serious threat against the budgerigars and in aviary birds and shown significant

mortality. Gonzalez-Hein [11] also reported that intestinal nematodes such as *Ascaropes* sp. and *capilaria* spp are the main causes of aviary. Prathipa [12] identified *ascardia* sp and *capillaria* sp in budgerigar, african love bird and cockatiel. Endoparasitic infection is common in birds kept in captivity. Parasites are considered as the main cause of co-evolutionary parasite-host relationship as captive bred birds may be significantly are the main cause of the transmission of parasites towards the other animals kept in the same area [13]. Therefore, surveys are considered baseline to know the disease outbreaks and epidemiological studies [14]. This study was done to find out the presence of fecal parasitic oocysts in the parrots species cockatiels (*Nymphicus hollandicus*) and budgerigars (*Melopsittacus undulatus*) through different laboratory methods.

## Materials and methods

### Sample collection

Fresh fecal samples of the 560 parrots (Cockatiels and Budgerigar) were collected from the local markets and home fanciers of the Jhang and Layyah districts through manual method in the plastic bags.

### Laboratory diagnostic techniques

All the samples were examined through direct smear, sedimentation and floatation methods.

### Direct smear examination

In this method, ten ml Normal Saline was mixed with 0.5g of feces and the solution was filtered through a sieve to remove the debris. Then, the two drops of the filtrate was placed on the glass slide and covered with a coverslip after making the thin smear that was examined under the microscope for the detection of parasitic oocysts [15]. The positive samples were

further examined by direct smear examination, sedimentation and floatation methods.

**Sedimentation technique**

The samples that were positive for the direct smear examination were further identified by Sedimentation method. In this method, three grams of the fecal samples were mixed in the distilled water and sieved. Centrifugation of the filtrate was performed at 1500 rpm for 2 minutes. The supernatant was discarded and a drop of sediment was placed on the glass slide and parasitic oocysts were detected under the microscope [16].

**Flotation technique**

The samples that were positive for the direct smear and sedimentation methods were examined through [17].

**McMaster counting Technique**

EPG (eggs per gram) in fecal samples were measured through the McMaster method as proposed by [18].

**Statistical Analysis:**

Statistical analysis was done through Quantitative Parasitology (QPweb) software Version 1.0.10. The percentage of prevalence, mean intensity and mean abundance following the statistical methods was described by [19]. Measures of infection are presented in Table 1.

**RESULTS**

**Table 1. Measures of Fecal Parasites (prevalence, mean intensity and mean abundance) stratified by Parrots sampled**

Area	Birds Species	Parasite Species	Total infected Birds	Infected Birds	Not Infected Bird	% Prevalence Infected bird	Mean Intensity	Mean abundance
Layyah	Cockatiels	Eimeria	170	120	30	70.5	1.41	0.6
		Capillaria		30		17.6	5.67	0.15
		Mixed Infection		20		11.7	8.5	0.1
	Budgerigars	Eimeria	90	80	10	89	1.12	0.8
		Capillaria		10		11	9	0.1
Jhang	Cockatiels	Eimeria	210	210	40	100	1	0.84
	Budgerigars	Eimeria	120	120	30	100	1	0.8

- **%Prevalence**-(no. of infected birds/total no. of birds examined (infected and non-infected)×100
- **Mean intensity**-total no. of parasites within infected host/total no. of infected birds with that parasite
- **Mean abundance**-total no. of individual parasites in infected host/total no. of hosts examined (infected and non-infected)

**DISCUSSION**

Most poultry birds are subjected under the hygienic environmental conditions and vaccination against the different harmful diseases as these are bred in the controlled houses or in the captivity. But, parrots have no vaccination available against the harmful infections and these are bred in the open houses and they have no proper hygienic conditions in the captive environment. So, these factors have the great involvement for the harmful diseases in parrots as compared to the other poultry or captive birds. There are different endoparasites of parrots i.e. *nematodes*, *cestodes*, and *protozoa* that are involved in the low production of eggs, less growth and mortalities of the birds. Different techniques are involved for the proper diagnosis of parasites in the birds. But, the fecal examination is the most probable method for the detection of parasites incidence in the birds.

We observed 250 cockatiels and 100 budgerigars birds from the Layyah district. Prevalence of the parasites identified in the both parrot species was one protozoan (*Eimeria spp.*) and one Helminth (*Capillaria spp.*). The parrots were parasitized with the coccidian spp the most as compared to *Capillaria spp.* Prevalence of the bird positive for the coccidiosis in Layyah was found (120/170) 70.5% and for *Capillaria* was (30/120) 17.6% in Layyah Cockatiel species and mixed infection (*Eimeria spp.* + *Capillaria spp.*) prevalence was (20/120) 11.7% in Layyah cockatiels also identified as shown in Table 1. The incidence of budgerigars Layyah parrots showed was (80/90) 89% for coccidiosis and for *Capillaria* was (10/90) 11% and no mixed infection (*Eimeria spp.* + *Capillaria spp.*) was reported in the present study of Budgerigars parrots of Layyah. Prevalence of the cockatiel and budgerigar identified for the parasite diagnosis in Jhang; both showed positive for the coccidian only. But, the prevalence of coccidiosis in cockatiels was (210/210) 100% and in the budgerigars was (120/120) 100% and no other parasite was reported in the present study at jhang district for two species of parrots.

EPG counted through McMaster slide for the *Coccidia* was 750, while the EPG for *Capillaria* was 700 in both cases of cockatiels and budgerigars of Layyah and EPG counted through McMaster slide for the *Coccidia* was 750 in both cases of cockatiels and budgerigars of Jhang.

Previous researchers have reported the endoparasites that are co-related with the present study as incidence in 11.1–51.9% of zoo birds in Turkey [20], from 48.1% to 71.4% in India [21,22], 51.6% in Spain [23], and in 22.5% of pet birds in Japan [24]. *Eimeria* and *Isospora* infections were also reported in *Passeriformes* and *Psittaciformes* [25,26]. This study is also related with the findings of [27] as he conducted a study in 2005 and 2011, a total of 10,356 faecal samples of different avian species were determined. He reported that *Coccidia* (mainly *Eimeria spp./Isospora spp./Caryospora spp.*), *Capillaria spp.*, *ascarids* (mainly *Ascaridia spp./Porrocaecum spp.*), *Heterakis spp.*, *Trichostrongylus spp.* and *Amidostomum spp.* were the most frequently identified parasites. Very less prevalence of coccidia; But the prevalence of *capillaria* was the same as identified by [1] as he determined the endoparasites in zoological gardens in

Serbia conducted during 2015 and 2016 from 318 individual birds belonging to 112 species and diagnosed 7 different parasites and the prevalence of *coccidia* and *capillaria* reported was in the ranges between 8.33% and 32.84%, and 2.77% and 29.41% respectively. Sierra [28] diagnosed *capillariosis* with the prevalence of 100% in *Falconidae*, *Psittacidae* and *Ramphastidae* birds from the captive fauna center in Columbia. But this study has not supported the present study. Low prevalence of mixed infection with *Syngamus* and *capillarids* (0.7%) was found in the same peacock species from Italy [7] and this study also showed very low prevalence of *capillaria* than the present study results. The research conducted in India, Prathipa [29] diagnosed mixed infection with species from genera *Capillaria*, *Ascaridia* and *Trichostrongylus* in 60.78% of zoo birds of *Psittacidae* family and this study also not supported the present study results.

Patra [30] determined the prevalence of endoparasitic infections of birds in different zoological gardens in North-Eastern region of India that was investigated from February 2018 to January 2019 of 1,275 fecal samples from 10 different species of captive birds. The overall prevalence of helminths found was 29.25%. With that, coccidian oocysts, eggs of *Capillaria spp.*, *Ascaridia spp.*, *Heterakis spp.*, *Raillietina tetragona*, *R. cesticillus*, *Echinostoma spp.*, *Strongyloides avium*, *Dispharynx spp.*, eggs of unidentified trematode and co-infections with more than one species were recorded from some Zoological gardens. This study correlated with the present study as coccidian was the most prevalent parasite in different species.

Papini [7] collected faecal samples individually from pet (n = 63) and zoo (n = 83) birds representing 14 orders and 63 species. Overall, 35.6% of the birds harboured parasites (42.2% of zoo birds and 27% of pet birds), including *Strongyles-Capillarids* (8.9%), *Ascaridia* (6.8%), *Strongyles* (5.5%), *G. duodenalis Assemblage A* (5.3%), *Coccidia* (4.1%), *Cryptosporidium* (4%), *Porrocaecum* (2.7%), *Porrocaecum-Capillarids* (2%), and *Syngamus-Capillarids* (0.7%). This study has not supported the present study results; as very less prevalence was identified in this study than the present study. Cunha [13] reported endoparasites in faecal samples from cracids (curassows and allies) bred in captivity at the Parque Dois Irmãos, Recife, and Pernambuco state in Brazil. The results obtained were positive for *Strongyloides sp.*, *Ascaridia sp.*, *Capillaria sp.* and cysts of *Entamoeba coli*.

Marietto-Gonçalves [31] reported that *coccidia* were the commonest parasites in their analyses on birds. However, it is worth pointing out that in that study 95.45% of the samples testing positive came from *Passeriformes*. This study has supported the present study results as very high prevalence was identified in this study like the present study results. Eggs of *Capillaria sp.* have also been recorded in the faeces of the orders *Galliformes* and *Passeriformes* [31] that supports our study results.

The present study revealed the parrots cockatiels (*Nymphicus hollandicus*) and budgerigars (*Melopsittacus undulates*) infected with different types of endoparasites. Mixed infections were also seen in examined cockatiels parrots of layyah district. This was a preliminary study for identification

and prevalence of parasites in parrots. The prevalence of these infections in parrots would be better identified by further extended molecular studies. Necessary prevention and control programs should be implemented to reduce the risk of parrots to get rid of infection. Furthermore, proper management practices and public awareness strategies should be adopted to stop the spread of pathogens from parrots to other livestock and humans.

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